DOCUMENT RESUME

ED 357 499 EA 024 935

AUTHOR Cooper, Bruce S.; And Others
TITLE School-Site Cost Allocations: Testing a Micro-Financial Model in 23 Districts in Ten States. 2nd Revision.
PUB DATE 12 Mar 93
NOTE 53p.; Paper originally presented at the Annual Meeting of the American Education Finance Association (Albuquerque, NM, March 18, 1993).
PUB TYPE Speeches/Conference Papers (150) -- Reports - Research/Technical (143)

EDRS PRICE MF01/PC03 Plus Postage.
DESCRIPTORS *Accountability; Budgets; *Educational Finance; Elementary Secondary Education; Models; Money Management; Productivity; *Resource Allocation; School Districts; *School District Spending; School Funds

ABSTRACT

Findings of a study that developed and applied a microfinancial model to track financial resources through the school systems are presented in this paper. The School Site Allocations Model (SSAM) shifts the current finance structure to the schools. First, the model was designed and tested in 30 school districts across the United States. Next, data from the test sites were analyzed to provide indicators of the range of costs required to operate the central offices and schools in 25 school systems, and the use of funds for administration, operations, staff development, student support, and instruction at both central offices and schools. A conclusion is that the SSAM effectively reported the uses of funds by schools and by function, by level, and by type. District administrators and staff found the model to be "user friendly." Once costs were allocated by location and function, districts were able to track funds to each school and classroom level. Several superintendents reported that the SSAM data allowed them to save money, improve programs, and reassure the voting public. Also, statewide application of the model can play an important role in the school-reform movement. Thus, money does matter, it seems, as long as the resources reach schools, classrooms, teachers, and pupils. Twelve tables and four figures are included. (Contains 16 references.) (LMI)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED357499

2ND REVISION: MARCH 12, 1993

SCHOOL-SITE COST ALLOCATIONS:
TESTING A MICRO-FINANCIAL MODEL IN 23 DISTRICTS IN TEN STATES.

Bruce S. Cooper, Ph.D.
Fordham University School of Education

and Associates:

Dr. Robert Sarrel , Syosset Public Schools, New York
Dr. Peter Darvas, New York University Dept. of Sociology
Frank Alfano, Cliffside Park Public Schools, New Jersey
Judith Samuels, Robert F. Wagner School, New York University
Susan Heinbuch, Robert F. Wagner School, New York University
Robert Martin, U.S. Chamber of Commerce, Washington, DC
Larry Maloney, U.S. Chamber of Commerce, Washington, DC

Please contact:

Dr. Bruce S. Cooper
Fordham University Graduate School of Education
26 East 10th Street, #9C
New York, NY 10003
TEL: (212) 254-1192
Fax on same line; call in advance.

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

☑ This document has been reproduced as received from the person or organization originating it.

☐ Minor changes have been made to improve reproduction quality.

• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY

B. Cooper

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

The research reported in this paper was in part supported by a grant from the Eli Lilly Endowment, through the Center for Workforce Preparation and Quality Education, US CHAMBER OF COMMERCE, Washington, DC. The Model is under copyright. Do not use or publish without written permission of the author, Bruce Cooper. NYC. Comments, ideas, and suggestions are greatly appreciated.

Paper prepared for the American Education Finance Association, March 18, 1993, Albuquerque, N.M. © Copyright. March 10, 1993.

EA024935

BEST COPY AVAILABLE

SCHOOL-SITE COST ALLOCATIONS:

TESTING A MICRO-FINANCIAL MODEL IN 23 DISTRICTS IN TEN STATES

Bruce S. Cooper, Ph.D.
Fordham University

> A school-based funding structure would be quite different . . . . The school would be the primary recipient of local, state, and federal revenues. In other words, the revenues supporting the foundation expenditure level and all categorical revenues would be allocated directly to the school. The school would then have to budget the funds. The school would, thus, have the authority to determine the mix of professionals -- teachers, administrators, adjunct teachers, and so on -- at the school site and to hire, supervise and promote and fire them. Further, the school would have fiscal and programmatic responsibility for operations, maintenance, substitutes, books, materials, supplies, and staff development. (Odden, 1992, p. 333)

* * *

INTRODUCTION

School finance in the United States is undergoing a subtle but significant shift -- one reflecting changes in the very organization of schooling itself. From its beginnings, it seems, the system of financing education centered on "state-to-district finance structures," to use Odden and Pincus's (1992) term. In particular, state governments set the finance rules and regulations, provided varying amounts of money, and called upon the local school districts to report on where the money went (Burrup, 1988, pp. 396-402). The purpose was clearly control and accountability. Or, as the Governmental Accounting Standards Board reports: "To present fairly and with full disclosure the financial position and results of financial operations of the funds . . . and to determine and demonstrate compliance with finance-related legal and contractual provisions" (1985, p. 9).

The new face of school finance is very different. While state authorities still have a prevailing interest in seeing that school funds are legally and appropriately used, the new school finance in particular -- like the new school reforms in general -- is centered more on the school and classroom. And the purpose is to inform the various local publics of where resources are going. Under the old system, it made little difference that only "finance experts" were comfortable with the accounting lingo, and that the system had become a complex plethora of budget codes, function codes, object codes, and arcane terms that were too obtuse for even the educated lay person to decipher. The school finance structures of most states were much like the Internal Revenue Code: a conglomeration of rules and regulations, processes and procedures, which grew up over the years and was almost never scrapped, redesigned, and simplified. Instead, the system was changed by augmentation and accretion, with many new provisions coming on top of the existing rules -- a means for "improving" the existing procedures that was almost sure to mean a confusing, contradictory state "handbook" on local school finance.

For, the purposes of school finance were not simple, accessible information, broad inclusion and public involvement; rather the goal was to operate a system that was reasonably efficient for the business officers and auditors--who annually reassured the local school board, superintendent, and state officers that "moneys" in the district were indeed being spent legally and honestly.

It's no wonder, then, that historically school finance was a small, closed shop of number-spouting, code-coughing business managers. After all, as long as they all "spoke the same language" and the ledger books were kept in standard ways (most states have a common coding system for income and expenditures) and auditors were pleased, then the process was working well from their professional perspective. Since the 1980s, however, we see signs that the mask is being lifted and the voting public, school-site leadership teams, and attentive lay persons are seeking more information -- in forms and terms that they can understand. Superintendents, also prisoners of the old "systems speak" of their finance

process, are finding it more difficult to get state and local budgets and bond issues passed since their finance reports do not easily answer the following fundamental questions which the electorate often raised:

How much of the district's money is going into central office administration? How much is reaching the schools? the classroom? the pupils? How much reaches each and every school and classroom? What does it cost to "operate" and "manage" the school system as compared to funding instruction, counseling, coaching, and other student-related services? How much of the "new" allocated money gets to the students?

When local school administrators cannot answer these questions simply, credibly, and directly, the business community, the so-called "taxpayers' groups", and the growing "elderly voting population" sometimes become frustrated and vote against bond issues or school budget increases. Further, as school districts experiment with school-site management and shared decision making, teachers and other leadership team members request information on the district's expenditures for their school. But districts don't always have the fiscal data in a form that anyone outside the "inner circle" can understand.

Even insiders are confused by the overlapping categories, the state-by-state differences in terms and categories, and the failure of the school finance system to make real sense. Districts often suffer from too little relevant information about some things and an over-abundance of numbers on others. True, districts keep complete lists of all expenditures -- a thick print-out (fondly called the "green book" in one district). It lists each cost by item, source, object, function, and location code. But since the data are rarely displayed in a sympathetic manner, few outsider can interpret what it means for their school and their interest.

New Developments

Recently, led by Allan R. Odden and colleagues, however, a small number of scholars and researchers are calling for a revolution in school finance. Odden (1992) believes, as do others, that the *school* is the essential unit in education, not the district, not the state, and

not the "central office." It is in schools and classrooms that most "intentional learning" occurs. Purkey and Smith (1985) further suggest that effective education is positively associated with school-based finance and management. The closer management practices are to pupils, the stronger the chances that good decisions are to be made (see Brown, 1990; Clune and White, 1988; Malen, Ogawa, and Kranz, 1990). Clune and White explained that "school-based management is a system designed to improve education by increasing the authority of actors at the school site" (1985, p. 4).

Odden, then, concludes "that education financing in the twenty-first century [if not sooner] should become primarily *school* rather than a *district* based" (1992, p. 328). But Odden and Pincus (1992) also admit that inadequate financial models currently exist for accounting for resources at schools and classrooms:

> Inter district resource allocation has dominated the study of school finance for years. But there is insufficient information on how to put dollars to productive use in districts, schools and classrooms. Indeed, there is considerable misinformation about how schools use their money. Former US. Secretary of Education William Bennett implied [some say, insisted] that too much money was used for administration; he popularized the term the "administrative blob". (p. 256)

Wohlstetter and Buffett (1992) pose the problems somewhat differently: while school districts are experimenting with decentralized decision-making, "little has been written on the financial dimensions of school-based management" (1992, p. 129).

Three problems arise in trying to build a model that captures school-site and classroom allocation costs within a public school system. First, a school-site allocations model should be constructed and tested to see whether it works in a variety of school districts and states with varying finance systems. Second, school districts should be encouraged to try the model, using their own existing financial systems, to see if the data are useful for determining and improving district expenditure patterns. And third, state departments of education and other state and federal authorities should match the school-site allocations system to the state's auditing and accountability system -- to see if, in fact, the site-based model can work within and across districts. Hence, data need to be both specific to each school and instructional program *and* to other districts for comparison. It should be both

a school-by-school information source and a cross-school, cross-district basis of comparison.

The Research

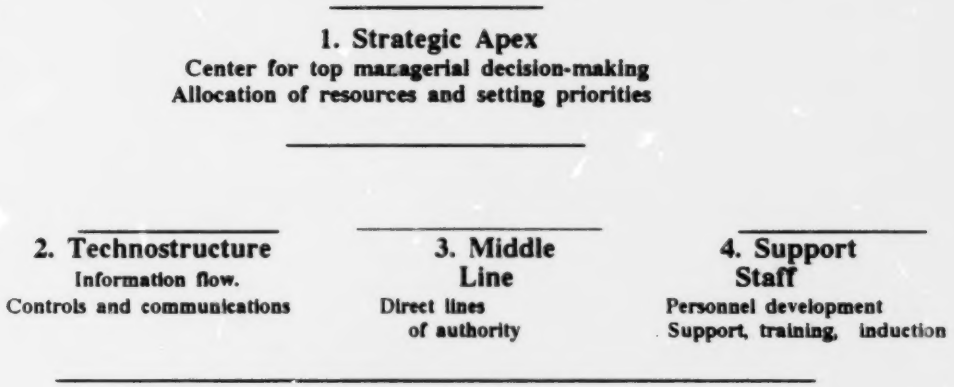
This paper presents both the process of creating and testing a new model of school micro-finance and means of analyzing the **accuracy** of district and school-site expenditures, the **efficiency** of resource use, and the **productivity** of schools in positively affecting student attainment. The development process began with a single question: How much money was reaching the classroom for instruction in New York City (Cooper and Sarrel, 1991; Weschler, 1990). By analyzing unit allocations to the 116 New York City high schools, a primitive first "model" was developed and tested. This "cascade" analysis gained some recognition but was limited. It failed to account for the $11 million not reaching the school. It did not take into account the 900 other schools, (elementary, middle, alternative etc.) nor many of the "central office" costs.

Building the School-Site Allocations Model (SSAM)

This analysis is based on a set of assumptions, which are also being tested. First, and fundamentally, the funding of education follows the basic structure of school systems. Thus, to understanding how money is allocated and used, we must begin with how school districts are configured and the functions that occur at each level. While this is hardly the place to detail the history of school district development–from single schools operated by charitable groups, societies, and community groups, through "clusters" of schools, through the formal arrangements that are now standard practice – it is essential to begin with the basic structure which has become common in almost all of the nation's 15,430 local education authorities (school districts). The few exceptions may be single schools, even one-classroom "districts," which are now so rare as to be novelties.

Furthermore, most all school districts have a somewhat similar structure and "divisions of labor." School buildings house teachers who instruct students, the *core technology* of education, and a "central office" which contains managers, supervisors, and administrators who plan and help to operate the system. Even where the management function is physically located in a school building and even if the school superintendent, the chief education officer, is also the high school principal, the functional division between the management "subsystem" and the "production" or "core technology" of educating children is maintained. As Henry Mintzberg determined, "We end up with an organization that consists of a core of operators [i.e., teachers], who do the basic work of producing the products and services, and an administrative component of managers and analysts, who

Figure 1
THE FIVE BASIC PARTS OF ORGANIZATIONS



Source: Henry Mintzberg, *The Structuring of Organizations: A Synthesis of the Research.* Englewood Cliffs, New Jersey: Prentice-Hall (1987).

take some of the responsibility for coordinating their work" (Mintzberg, 1987, p. 19). In general, as Figure 1 shows, the upper parts of the system perform a coordinating, planning, and support function while the lower parts perform the actual core operations (producing goods, services). Mintzberg includes five basic functions in his depiction of

organizations. The Strategic Apex rests on three main functions, the Technostructure which does the planning, analysis, and training and sets and maintains standards and controls; the Support Staff who provide direct services to central office and production units; and the Middle Line, those in the "chain of command," the first line supervisors who control the sub-units of the organization. In all, as Mintzberg concludes, "Organizations have always had operators and top managers, people who do the basic work and people to hold the whole system together" (p. 34).

The School System

School districts resemble other large organizations. The Core Technology (e.g., teaching and learning) takes place in the school building while the major Strategic Apex (managing and governing) is usually located in a Central Office of some sort, as Mintzberg explains. Figure 2 shows the various sub-systems, including the system level functions (planning,

Figure 2

Basic School District Functions

∞ **SYSTEMS LEVEL:**
- Management Sub-System
  --Organization
  --School Board
  --Central and Regional Offices
  --Control and Accountability
- Operations Sub-System
  --Building, Facilities, Grounds
  --Planning and Research
  --Personnel
  --Curriculum Development

∞ **BUILDING LEVEL:**
- School Sub-System
  --Management
  --Facilities and Grounds
  --Staff Development
  --Pupil Personnel Support
  --Local School Culture and Context

∞ **CLASSROOM LEVEL:**
- Teaching Sub-System
  --Teachers, Instruction
  (Teaching and Learning functions)
  -- Materials, books, teaching aides, equipment, books

∞ **PUPIL Sub-Culture**

personnel, facilities) and the building-level sub-systems, housing the classroom and the related instructional functions. Larger systems tend to rationalize this process, devoting offices and staff to each. Further, the need to coordinate, monitor, and control the various functions often requires a management-of-managers level, explaining the size and complexity of school district organization. Even in the smallest of district, someone is devoting part time to the "function" of managing and operating the "central office" functions.

The production units — in these cases, the *schools* (comparable to, in business, a marketing division, a factory, and sales office) — also have their own supervisors and administrative functions (principals' offices), controlled in part by a factory manager, sales director, vice president for marketing and development, or a school building principal. Thus, it comes as no surprise in school districts that the superintendent and the principals are performing similar and related functions: coordinating, directing, making decisions, motivating, though their purview and span of control will be different.

A school district, then, has a central office function and a school building function, operating somewhat separately but being part of the same system. It is important in tracking resources from the "top" of the system to the school and classroom to determine whether funds are being spent centrally or de-centrally (schools). School districts for convenience of accounting sometimes assign staff to the Board but who actually work in schools. For example, in one large district, the transportation, food services, school security, and curriculum development were all accounted for centrally even though these services were in large part school-based. Conversely, staff from schools may be assigned to the central office to write curriculum or do staff development, and their salaries and fringe benefits are charged off against the school's expenses. Whatever the case, it is essential that costs be accurately attributed to where they are expended, to give a real picture of the financial costs of running each unit.

Functions

So far, we have looked at the school system as a structure; but they also within thes organizational arrangements, certain functions are presumably performed. In fact, we shall argue that district office and school perform complementary, even common, functions, separated mainly by their location and the scope of their concerns.

Function A. **Administration-Management** . Like the Strategic Apex discussed by Mintzberg, this function, whether in the superintendent's or the principal's offices, sets the goals, direction, and other key decisions, motivates staff, hires, evaluates, fires, deals with crisis, and concerns itself with the surrounding environment.

Function B. **Building Support.** Schools and central offices require direct maintenance. These facilities must have cleaning, lighting , heating, water, gas, and renovation. Buses and other heavy equipment, stadiums, ice hockey rinks, and other hardware, infrastructure, and materials must be purchases, maintained, stored, and transported. This function combines both capital goods (buildings, buses, heating equipment etc.) and the resources necessary to operate, clean, repair, and improve them. Hence, Function B includes both facilities and operations at both the Central and School levels.

Function D. **Pupil Support.** Students need support outside the classroom and beyond their academic instruction. They will require guidance counseling, help in the media center or library, college advising, or perhaps some psychological testing or participate in a range of extra-curricular activities, clubs, sports, drama and yearbook. This function may be operated out of the district office although these functions must meet the child in the school.

Function E. **Direct Classroom Instruction** . The core technology of education is teaching and learning which generally occurs in the school and classroom. This function often includes teachers, teacher aides, or paraprofessionals, as well as materials, computers, books, and disposable materials that are used with students in the classroom setting. At the central office, some staff may also be preparing materials for children to use: curriculum, programs, art work, tests, and other instructional support. Together, the classroom teacher and the curriculum writer provide the resources around which school instruct and pupils learn.

ANALYSIS PROCEDURES

Implementing the School Site Allocations Model

The process of analysis, as tested in 28 school systems, takes several steps. First, the School Site Allocations Model requires determining the "location" of costs, between those which are "central" and those that are "school"-based. Second, the Model requires that districts attribute these expenditures to the function that they fulfill at central and school. Then, data are aggregated, analyzed, and applied.

- **LOCATION:** The model takes as its first step the separation of "school" from "central" costs, based on where the expenditures are incurred, not where the accounting office keeps them. The costs of staff who divide themselves between working at the central office and doing workshops, lessons, teaching, teacher training and other activities in the schools are proportionately allotted to several sites and jobs.

- **FUNCTION:** Next, once resources are attributed to the correct site, some determination of their function is necessary. The model creates five functions divided by where they occur: administration, operation and facilities, staff support, pupil support, and instruction. See Figure 3. Once these five functions are separated by Central versus School, the model is as follows:

Figure 3

The Allocation Model

CENTRAL OFFICE:	*SCHOOL SITE:*
FUNCTION A--ADMINISTRATION --Superintendent, staff, offices, supervisors, directors, including salaries plus fringe benefits	**Function a--Administration** -- Principal, assistants, secretaries -- Office expenses, salaries plus fringe benefits.
Central Office: **FUNCTION B--FACILITIES and OPERATIONS** --Central office buildings, lights, heat, air conditioning, repairs, maintenance upkeep, plus the cost of coordinating and running the facilities and operations. Salaries and fringe for Operations management staff at Central.	***School Site:*** **Function b--Facilities and Operations** --School site building costs, including utilities, repairs and custodial costs, bus services, food services.
Central Office: **FUNCTION C-- STAFF SUPPORT & DEVELOPMENT** --Planning, coordinating and directing the teacher in-service education, staff training director and staff, who work the Central Office.	***School Site:*** **Function c--Staff Support Development** -- Delivery of school-site staff development, mentoring, coaching, sabbatical leave, out of other teacher support efforts.
Central Office: **FUNCTION D-- PUPIL SUPPORT** --Coordination and direction of student support function. Salaries and fringes, office and secretary for the Pupil Personnel and support functions, psychologists and others who direct and coordinate student services.	***School Site:*** **Function d--Pupil Support** **--Direct Services to students** -- Out-of-classroom student support, including school guidance counselors, media and library staff, coaches, club leaders, and others who work with students. Salaries and fringe benefits, plus offices.
Central Office: **FUNCTION E--INSTRUCTION** --Coordinators and directors of instructional program, who provide services to teachers in their classes. Costs of supporting instruction--such screening textbooks, writing tests and materials.	***School Site:*** **Function e--Classroom Instruction** --Teachers salaries and fringe for work done in classroom. Other classroom staff costs, including teaching aides, paraprofessionals; Textbooks, materials, computers used in classrooms; paper, chalk and other disposable materials

These five functions -- **Administration, Operations, Staff Development, Pupil Support,** and **Instruction** -- are hardly new; in fact, they were constructed to fit the functions of school systems, schools, and classrooms as now organized. Further, the setting of these functions in both the Central Office and the School Site was believed to show that Central Administration and School-Site Administration, for example, were in mutual support.

The lettering is also useful, with BIG **A ADMINISTRATION** occurring at the Central office, and Little **a, administration,** at the school site. Together, Levels **A + a,** comprise the administrative function for the system, permitting a District-wide measure of "administration" generally, Central Office Administration, and School-Site costs, together and for EACH separate school and program.

TESTING the MODEL

*T*he SSAM, with its ten functions, was tested in eight school districts all across the nation (called the Lilly districts to maintain some confidentiality), followed by 15 more in Colorado, plus five more in Ohio, and two in New Jersey, for a total of 30 all across the nation. The research was also unusual. The study team worked with each district, teaching them the model and how to re-configure their charts of account to fit actual expenditures (NOT budgets) into the SSAM framework,. We used their own management data base and information system (giving districts ownership of their own finance model and results).

The steps were straightforward. A total expenditure amount was calculated and agreed up, one based on actual costs during the last fiscal year, excluding any unrelated or inappropriate costs (capital costs, summer school, retirement incentive costs, fees for county treasurers' transfers, etc.). A total pupil population is figured out, including and excluding special education. A district-wide per-pupil cost figure was arrived at. The remaining expenditures from the district were then assigned to a location and category, item by item. Most districts had their costs on computer in a management information system and could use the

identification codes to help aggregate the information to a function and a site (central board of a school).

Taking the identification code for a school, we divided up the costs as follows: the salary and fringe benefits of Principals and Assistant Principals were placed into Administration, Level **a** at their schools. The school's custodian, ground maintenance, bus drivers, truck drivers, plumber, and electrician were placed into operations at Level **b**, as were the portion of the bus costs depending on the number of students being bused to school.

Teacher trainers, peer coaches, trips, and in-service education costs were placed in Level **c, Staff Development,** as was the principal's trip to a state administrator's staff development day. Guidance personnel, athletic coaches for intramural and inter-scholastic athletics, librarians, college advisor, senior play costs, equipment for sports and clubs, and other costs for services delivered to pupils OUTSIDE the classroom go into Level **d, Pupil Support.** Finally, all direct classroom costs were charged to Level **e, Instruction,** including teachers' salaries and fringes, equipment, chalk, teaching assistance, textbooks, pedagogical computers, student tests.

SAMPLE DISTRICTS

Table 1 indicates the first eight districts in which the Model was applied, ranging in size from about 6,500 pupils to almost 76 000, from districts with 11 schools to those with over 120 schools. All together, the Model has accounted for some $1.135 billion, to educate a total of 264,456 students in 425 schools. The per pupil costs in the year studied, 1990–1991, the last full year of data available at the time, ranged from a high of $7,899 per student overall in District II to a low of $3,024 per student in District I, with the average around $4,200 per student. District total expenditures were from a high of $340.876 million in District VII to $19.576 million in total in District A. Hence, the District that spent the most overall, District VII, was not the largest with 75,640 pupils: District VII hand a few more

students (75,789) but spent less in total resources ($308.717 million). The per pupil cost was slightly higher in District VII at $4,507 while the biggest district, District VIII, spent slightly less at $4,073 per student.

TABLE 1
SAMPLE DISTRICT DATA
Enrollments, Total Expenditures, Per Pupil Expenditures, and Number of School, 1990–1991 by Enrollment (Size)

SCHOOL SITES	ENROLLMENT 1990-1991	TOTAL EXPENDITURES	PER PUPIL COSTS	SCHOOL NUMBERS
District I	6,473	$19.576 Million	$3,024	11
District II	7,483	$59.105 M	$7,899	14
District III	8,925	$43,846 M	$4,913	15
District IV	9,001	$45.481 M	$5,053	13
District V	12,261	$45.729 M	$3,730	21
District VI	67,140	$257.719 M	$3,839	121
District VII	75,640	$340.876 M	$4,507	109
District VIII	75,789	$308.717 M	$4,073	118
TOTAL:	264,456 pupils	$1.135,226 Billion	$4,293/pupil average	425 schools

Modes of ANALYSIS

In each of the 32 school systems where the SSAM was applied (though analysis is only completed on the eight above), expenditure data were configured in four ways to make full "cascade" analysis possible. First, the real aggregate dollars were displayed by location (school and central) and by function (administration, operations/facilities, staff support, pupil support, and instruction support). Second, at each school and central office, the costs by function were divided into the total expenditure at that site, to give an indication of what percentage of the school's or central's resources were going for what function.

Third, site, central, and district expenditures were then divided by the unit's enrollment (called "register," pupil size), to gain a Per Pupil cost for each function at each site and all together. And then, fourth, the per pupil costs for each unit and function were divided by the

District-wide total per pupil cost, to gave a sense of how much of the per pupil expenditures went for each site and function. These four analyses allowed the following explorations, based on the ten districts (Lilly districts plus two in New Jersey).

Comparisons by location, function, type of school, and by "high" and "low" spending schools, function-by-function were performed. Then, several formulae for determining the "efficiency" of schools in delivering **Instruction** (Level **e**) and delivering the full students services (Level **d, Pupil Support, +** Level **e, Instruction** or **(d+e)** was created and tested. Each of the 422 schools in the Lily Sample were then assigned both a Student Instructional Ratio (SIR) and Student Services Ratio (SSR) coefficient.

We then tested to see the relationship between the use of funds and the levels of efficiency on both the SIR and SSR measures, and whether the size, type, District, or Socio-economic Status of each school was related to any degree to the resources reaching students. Some research exists, for example, that Elementary schools receive fewer resources than high schools, and that less is spent on lower-grade children in the classroom. This SSAM data base allowed us to build regression equations and to test the significance of these variables on school resource utilization.

Finally, as a pilot, we ran productivity tests to see if schools spending a higher percent in the Classroom at Level **e, Instruction,** had better test results. Using the standard SAT as one outcome, we could begin to build regression models to see how much of the variance in the y-variables, SAT results, can be accounted for using the SSAM data on dollars and percentage of resources in the classroom, Level **e.**

- - - from State-Centered to School-Centered Finance--the New ACCURACY

A series of questions framed this research, starting with how funds are dispersed between the central board of education and the schools, how the five functions break out at

the two settings, how the costs differ by elementary, middle, and high school, and how individual schools and functions compare.

1. What proportion of funds are expended at the central and school sites, as compared to national averages?

A first step in the analysis was to divide central and school expenditures for the eight Lilly districts and the 15 Colorado districts to show the range and patterns. These data are gathered by combining all the five functional costs (administration, operations, staffs support, pupil support, and instruction) at all schools versus the five functions at the central office, permitting an exact measure of how much of the District's resources are being spent on central management and how much are expended in the district's schools.

The national averages for central and school site costs are difficult to ascertain since the categories are so vague. The National Center for Education Statistics in the *Digest of Educational Statistics* (1987), for example, reported that about 1.7 percent of the staff employed work "District Administration," although another category, "Support Staff," with nearly 32 percent of the employees, might include people working in the central office. Even the broadest categorization -- as between "Instruction," "Support Services," and "Non-Instructional" personnel -- do not locate these staff, making it impossible to track resources through the system to schools. While "Support Services" includes "general and school administration, operations and maintenance," amounting to 35.4 percent nationwide, another category, "Non-instructional," may also be some central office and school site people, amounting to 3.5 percent.

Table 2 shows the eight district ratios of resources spent in the Central Office and those in the Schools as a group. The first column shows the total dollars spent by each sample district for Central expenses along with the percentage of the District's funds. The range is from 20.43 percent of total district costs or $ 1,004 per student ($8.958 million) spent

centrally in District III, through 14.50 percent ($1,116 per pupil or $ 8.571 million) in District II, to a low of 5.85 percent ($218 per student or a total of $ 2.670 million).

Table 2

Eight District Analysis of Central Office versus School Site Costs, Percentages, and Per Pupil Expenditures, 1990–1991

Districts	Central Costs Dollars/Pupil (%)*		School Costs Dollars/Pupil (%)*		Total District Costs Dollars/Pupil (%)*	
District I	$ 2.19M (11.2%)	$338	$17.39M (88.8%)	$2686	$19.576M (100.0%)	$3024
District II	8.571M (14.5%)	1116	50.535M (85.5%)	6577	59.105M (100.0%)	7693
District III	8.958M (20.4%)	1004	34.888M (79.6%)	3909	43.846M (100.0%)	4913
District IV	4.123M (9.1%)	457	41.358M (91.0%)	4580	45.481M (100.0%)	5037
District V	2.670M (5.9%)	218	43.059M (94.1%)	3512	45.729M (100.0%)	3730
District VI	20.532M (8.0%)	306	237.187M (92.0%)	3533	257.718M (100.0%)	3839
District VII	41.344M (12.2%)	546	299.541M (87.9%)	3960	340.885M (100.0%)	4507
District VIII	35.393M (11.5%)	467	273.324M (88.5%)	3606	308.717M (100.0%)	4073

* Due to rounding, percentages found in Executive Summary may not equal 100 percent.

Conversely, District III had the lowest percentage of resources reaching the school sites among the Lilly Study districts at 79.57 percent or $3,909 per pupil. District V was the highest at 94.14 percent. The last two columns show the total expenditures for both

Table 3

COLORADO ANALYSIS
OF DISTRICT AND SCHOOL SITE COSTS IN PERCENT AND DOLLARS
1991

DESCRIPTION	Levels	DIST. I	DIST. II	DIST. III	DIST. IV	DIST. V	DIST. VI	DIST. VII
ADMINISTRATION	A	3.97%	2.51%	3.30%	5.19%	3.39%	3.74%	3.98%
BUILDING SUPPORT	B	2.49%	3.63%	0.80%	1.60%	2.10%	0.90%	1.82%
TEACHER SUPPORT	C	3.24%	0.39%	0.60%	0.21%	1.10%	1.60%	0.38%
PUPIL SUPPORT	D	0.82%	0.10%	2.49%	0.34%	1.06%	0.23%	0.82%
INSTRUCTION	E	2.91%	2.39%	0.00%	3.62%	0.94%	0.80%	0.43%
SUB TOTAL		13.42%	9.01%	7.19%	10.96%	8.59%	7.29%	7.43%
Administration	Levels a	8.60%	7.52%	7.38%	7.90%	6.42%	6.84%	7.34%
Building support	b	10.64%	18.96%	12.93%	11.98%	16.08%	13.60%	10.08%
Teacher support	c	0.08%	0.24%	0.95%	0.10%	0.11%	0.57%	1.87%
Pupil support	d	5.60%	8.62%	12.57%	4.85%	7.39%	6.82%	7.15%
Direct Instruction	e	61.65%	55.64%	58.99%	64.20%	61.41%	64.90%	66.12%
SUB TOTAL		86.58%	90.99%	92.81%	89.04%	91.41%	92.71%	92.57%
GRAND TOTAL		100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
DOLLARS - MILLIONS								
ADMINISTRATION	Level A	$2.250 m.	$0.437m.	$2.234 m.	$3.816m.	$2.047m.	$2.490m.	$1.437m
BUILDING SUPPORT	B	1.410	0.631	0.539	1.181	1.269	0.600	0.657
TEACHER SUPPORT	C	1.834	0.067	0.404	0.156	0.665	1.067	0.138
PUPIL SUPPORT	D	0.462	0.017	1.687	0.247	0.638	0.153	0.295
INSTRUCTION	E	1.649	0.416	0.000	2.666	0.570	0.535	0.154
SUB TOTAL		$7.605m.	$1.568m.	$4.864m.	$8.066m.	$5.189m.	$4.845m.	$2.681m
Administration	Levels a	$4.871m.	$1.309m.	$4.997m.	$5.814m.	$3.881m.	$4.546m	$2.652m
Building support	b	6.029	3.299	8.751	8.818	9.716	9.041	3.640
Teacher support	c	0.048	0.041	0.643	0.073	0.068	0.376	0.677
Pupil support	d	3.175	1.499	8.506	3.572	4.463	4.534	2.583
Direct instruction	e	34.925	9.680	39.925	47.244	37.098	43.158	23.874
SUB TOTAL		$49.048m	$15.828m	$62.822m.	$65.521m.	$55.226m.	$61.655m	$33.426m
GRAND TOTAL		$56.653m.	$17.396m.	$67.686m.	$73.587m.	$60.415m.	$66.500m	$36.107m
PER PUPIL		$3,994	$3,972	$3,877	$4,141	$3,722	$4,379	$3,861

Table 3 (continued)

COLORADO ANALYSIS

OF DISTRICT AND SCHOOL SITE COSTS IN PERCENT AND DOLLARS

1991

	DIST. VIII	DIST. IX	DIST. X	DIST. XI	DIST. XII	DIST. XIII	IST. XIV	DIST. XV	STANDARD DEVIATION
A	6.19%	4.57%	3.90%	4.35%	4.02%	5.66%	2.59%	1.35%	1.20%
B	3.69%	1.38%	1.28%	1.14%	1.57%	3.42%	4.55%	3.92%	1.19%
C	1.01%	0.67%	0.28%	0.20%	0.91%	0.23%	0.60%	0.44%	0.76%
D	1.18%	0.00%	0.45%	1.23%	1.28%	2.74%	1.54%	1.56%	0.78%
E	1.11%	0.63%	0.32%	1.67%	1.88%	17.25%	1.35%	0.30%	4.10%
	13.18%	7.25%	6.22%	8.60%	9.64%	29.31%	10.63%	7.57%	5.47%
a	6.46%	8.08%	7.30%	7.34%	5.68%	6.50%	7.30%	9.58%	0.93%
b	11.38%	18.46%	16.59%	11.08%	10.31%	7.76%	11.21%	11.47%	3.16%
c	1.18%	1.02%	3.25%	0.21%	0.00%	0.07%	0.25%	0.33%	0.86%
d	13.86%	11.34%	5.07%	7.38%	10.74%	5.55%	9.57%	6.64%	2.72%
e	53.95%	53.85%	61.58%	65.39%	63.63%	50.81%	61.03%	64.41%	4.65%
	86.82%	92.75%	93.78%	91.40%	90.36%	70.69%	89.37%	92.43%	5.47%
	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	
A	$2.594m.	$0.688 m.	$2.149m.	$4.961	$5.805m.	$6.207m.	$1.146	$1.137	$1.733
B	1.544	0.208	0.704	1.304	2.264	3.753	2.014	3.289	0.991
C	0.422	0.101	0.155	0.232	1.311	0.255	0.265	0.371	0.498
D	0.494	0.000	0.246	1.398	1.846	3.002	0.680	1.308	0.821
E	0.466	0.095	0.175	1.906	2.710	18.906	0.599	0.249	4.584
	$5.520m.	$1.092m	$3.429m.	$9.801m	$13.936m.	$32.123m.	$4.704m.	$6.354m	$7.311m
a	2.705	1.217	4.024	8.369	8.208	7.123	3.230	8.044	2.299
b	4.766	2.780	9.151	12.623	14.894	8.508	4.959	9.625	3.362
c	0.496	0.153	1.790	0.240	0.007	0.077	0.111	0.273	0.442
d	5.807	1.708	2.795	8.408	15.514	6.080	1.235	5.573	3.426
e	22.600	8.110	33.964	74.522	91.956	55.687	26.999	54.056	21.810
	$36.374m.	$13.968m	$51.724m.	$104.162m.	$130.579m.	$77.475m.	$39.534m	77.571	$30.011m
	$41.894m.	$15.060m	$55.153m	$113.963m	$144.515m	$109.598m	$44.238m	$83.925m	
	$3,651	5,857	$4,202	$3,899	$5,152	$4,232	$4,167	$4,240	

Central and School in million, percentages, and per pupil costs. The Colorado data show somewhat similar trends. However, the highest percentage at Central (LEVELS **A--E**) was District IX with 29.31 percent and the lowest was 6.22 percent at District X in Table 3.

These findings dispel the commonly held conception that a large percentage of district costs go into running the central office. Among the 23 districts reported so thus, around 87 to 90 percent of costs were used in the schools for all functions. While the "blob" may be a problem in some districts, these showed that between 80 percent to 94 percent reached the school buildings, though we need further analysis to see how much of those resources were used for direct services to students.

2. How were Central and School Site costs distributed among the five functions, as compared to national averages?

The Model breaks out the costs among functions by site, to give a picture of where the resources are going. In Table 3, Colorado, the data are presented by school system or district and function, with rows 1 to 5 at the Central Office and rows 7 to 11 at the School Sites.

ADMINISTRATION:

• **LEVEL A-- Central Administration:** The data indicate that about 3 to 4 percent of the districts total costs are accrued for Central office Administration (Superintendent, assistants, offices, legal, finance, management information, personnel, contracts etc.), though the outliers in the Colorado study run from 1.35 percent in District XV up to 6.19 percent in District VIII. The Lilly Districts ran from about 9.71 percent in District III to 2.6 percent in District IV. In per pupil costs, which are influenced by the overall level of spending, went from $75 per student (District VI to $ 600 per student, though the latter

system had a high per pupil expenditure overall of $7,693 per pupil while the low district spent $3,024 total per student.

Table 4

Eight District Analysis of Central Office and School Site Data by Function in Per Pupil Costs and Percentages 1990–1991

Districts Per Pupil	A/a Admin.	B/b Operation	C/c Teacher Support	D/d Student Support	E/e Instruction
I ($3,024) PER PUPIL					
Central	$176 (5.8%)	$90 (3.0%)	$40 (1.3%)	$24 (0.8%)	$8 (0.3%)
Schools	$287 (9.5%)	$293 (9.7%)	$20 (0.7%)	$258 (8.5%)	$1,828 (60.4%)
II ($7,695) PER PUPIL					
Central	$600 (7.8%)	$71 (0.9%)	$172 (2.2%)	$37 (0.5%)	$236 (3.1%)
Schools	$492 (6.4%)	$914 (11.9%)	$26 (0.3%)	$572 (7.4%)	$4,573 (59.5%)
III ($4,913) PER PUPIL					
Central	$477 (9.7%)	$104 (2.1%)	$180 (3.7%)	$85 (1.7%)	$157 (3.2%)
Schools	$363 (7.4%)	$500 (10.2%)	$68 (1.4%)	$290 (5.9%)	$2,688 (54.7%)
IV ($5,037) PER PUPIL					
Central	$133 (2.6%)	$54 (1.1%)	$129 (2.6%)	$115 (2.3%)	$26 (0.5%)
Schools	$295 (5.9%)	$538 (10.7%)	$15 (0.3%)	$694 (13.8%)	$3,038 (60.3%)
V ($3,730) PER PUPIL					
Central	$134 (3.6%)	$41 (1.1%)	$9 (0.3%)	$27 (0.7%)	$7 (0.2%)
Schools	$169 (4.5%)	$692 (18.5%)	$56 (1.5%)	$241 (6.5%)	$2,354 (63.1%)
VI ($3,839) PER PUPIL					
Central	$75 (2.0%)	$122 (3.2%)	$9 (0.2%)	$14 (0.4%)	$86 (2.2%)
Schools	$231 (6.0%)	$546 (22.0%)	$26 (0.7%)	$224 (5.8%)	$2,206 (57.5%)
VII ($4,507) PER PUPIL					
Central	$284 (6.3%)	$116 (2.6%)	$115 (2.6%)	$21 (0.5%)	$10 (0.2%)
Schools	$362 (8.0%)	$466 (10.3%)	$9 (0.2%)	$338 (7.5%)	$2,785 (61.8%)
VIII ($4,073) PER PUPIL					
Central	$156 (3.8%)	$103 (2.5%)	$62 (1.5%)	$78 (1.9%)	$69 (1.7%)
Schools	$285 (7.0%)	$367 (9.0%)	$0 (0.0%)	$464 (11.4%)	$2,490 (61.1%)

• **Level a-- <u>School-site</u> Administration:** School-site costs for Administration, including the principal and assistants' salaries and fringe benefits, office secretary, supplies, telephone, duplicating, mailing, computer for management, were obviously higher than the Central office management, since all the schools were included. Row 7 of Colorado Table 2

BEST COPY AVAILABLE

indicates that the typical district spends around 7 to 8 percent of its resources administering the schools, though the range is from a low of 5.68 percent in District XII to a high in District XV of 9.58 percent. The eight Lilly districts show a similar range, from 9.52 percent or $287 per student in District I to 4.53 percent or $169 per student for School-Site Administration, Level **a**, in District V.

• **LEVELS A+a (Central plus School) Administration:** Taken together, Levels **A+a** provide data on the total costs of running the institutions in the District: the schools and Central office. About 11 to 12 percent of the Colorado districts' expenditures were purely administrative, meaning that the whole system was managed for between 10 and 13 percent. The Lilly study, being more national in scope, picked up a greater variety of Administrative costs, with a low of about 8 percent in District V to a high of 17.1 percent in District III. Hence, the extremes are greater in the wider sample. Again, even when the school and district management expenditures are combined, the Model does not point up vast sums going into administration.

The *Digest of Educational Statistics* (1989) presents "Administration" [located somewhere in the system] at about 4.4 percent in 1980 compared to 3.4 percent in 1930. By our study, this 4.4 level seems low but it is difficult to tell if its the year, 1989 versus 1992–1992 when our data were gathered or whether the definition of "Administration" is different. The data in this micro-financial study were gathered by aggregating all school-site costs to get the general Level **a** based on the real costs of managing the Central and all school sites.

BUILDINGS and OPERATIONS

• **LEVEL B--Central Operations and Facilities:** The sample Lilly districts expended about 2 percent (1.8%, as shown in Table 4, column 2) of the costs on housing the Central office and supervising the buses, buildings, and other infrastructure functions, with District F at the top with 6.31 percent and District B, the lowest, at 0.89 percent of its

per pupil costs. The range in the Colorado districts for Central operations 4.55 percent in District XIV to a low of .80 percent in District III . In per pupil dollars, the Lilly districts cost between $122 per student in District VI to $41 per student in District V for Central Office facilities and operations. Hence, the Central Office facilities were rather moderate in cost in the districts at Central but ran somewhat higher at the school sites, Level **b,** as we shall see below.

- **Level b--School Site Operations and Facilities:** The cost of running, maintaining, and servicing the **School Sites** showed a much greater variability than did Administration or **Central** facilities costs. In the 15 Colorado Districts, for example, the range was from a high of 18.96 percent and 18.46 percent in Districts II and IX respectively, making it the second largest expense in the system outside of Instruction, to the low of 7.76 percent in District XIII for School-site Operations.

In the Lilly national data set, the average was 12.66 percent, with the high being 22.04 percent in District VI and 9.00 in District VIII. The per pupil costs in the schools for building support and busing services was an average of $629 per student, although the range is $992 per pupil at the high end in District V to a low of $293 per pupil in District I. Overall, then, the cost in the Lilly districts for both Central and School Site operations and facilities was 14.49 percent or on average about $722 per student.

Cutting costs in the operation of buildings can be useful, since it often involves better building use, husbanding of electricity, heat, water, gas, and bus travel. Reducing the cost of facilities can mean savings and more money for instruction, without eliminating jobs or major restructuring. A contest between schools, corridors, programs to save utilities can be fun, and the reward can be more discretionary money for programs, materials, texts and other pedagogical uses. Students can (and should) learn to turn off lights, close doors, pull down shades to keep the sun out on hot days, turn down thermostats when leaving rooms--good habits that save money at Level **b, Operations and Buildings.**

STAFF DEVELOPMENT

LEVELS C and c (Staff Support) at Central and Schools. The investment in staff training, in-service education, and other forms of professional development tend to be small in education, since teachers often pay for their own graduate work. The Model confirms that finding, with a high in Colorado in District X of 3.25 percent of per pupil costs but the typical school-site training amounts to about 1.5 percent. At Central, the high was 1.60 percent in District VI, and the low in District XI of 0.20 percent. The Lilly districts are also low, from 0% in District VIII at the School Sites but 1.52 percent at Central (most of the training is centrally handled), to a high in District III which has 3.67 percent at Central for training and 1.40 in the schools, for a total of 5.07 percent, the highest in Lilly.

PUPIL SUPPORT

• **LEVEL D--Central Office Student Support.** Most districts have a pupil personnel office in the central office to keep records, coordinate referrals and treatment, and handle guidance and other students assistance. In the Lilly districts, pupil support at Central was small, ranging from 1.91 percent at District H to a low of .28 percent in District IV. The per pupil cost were also small, running from $14 per student in District F to $115 per student in District III. The average was about $52 per student to coordinate students services. In Colorado, similarly, the range is from 2.74 percent in District XII to a low centrally in District II with .10 percent.

• **Level d--School Site Student Support.** This function is the direct delivery of services to students in the library, guidance suite, playing field, media center, club room, yearbook office. In Colorado, the percentages ran from an average of 13.86 percent in District VIII to a low of 4.85 percent in District IV. The Lilly sample recorded a high of 13.94 percent in District III to 5.83 percent in District VI, showing near parallels to Colorado data. The per pupil costs in ran from $705 per student for student support in District III to only $224 in District V. The average per pupil costs in the eight Lilly districts

school districts was $465 per pupil which reached $516 per student when totaled between Central ($52 per student) and School Site ($465 per pupil).

As the pressure on schools increases to provide a wider range of services, one can predict that Level **d** will grow, as will the supervision of it at LEVEL **D.**

INSTRUCTION

National data on classroom instructional costs indicate (see Figure 10.1 in Odden) that 61.1 percent of expenditures in 1987 went for "Instruction." California, according to Guthrie, Kirst, and Odden (1990), spent 63 percent of school expenditures in the classroom, with a breakout by sub-costs for teachers, aides, and specialists -- although they also include 5% for pupil services support which the SSAM model attributes to Pupil Support not classroom instruction. No data are indicated or analyzed by individual school.

Table 10.1
Current Expenditures in Millions for USA and Selected States, 1987 (Odden, 1992, p. 1259).

Figure 10.1 Current Expenditures (millions) by Function for the United States and Selected States, 1986–1987

		Instruction		Support Services[a]		Noninstructional	
	Total	*Amount*	*Percent*	*Amount*	*Percent*	*Amount*	*Percent*
U.S. average	$146.7	$89.6	61.1	$51.9	35.4	$5.1	3.5
California	16.5	9.3	56.1	6.7	40.8	0.5	3.1
Hawaii	0.58	0.35	61.1	0.19	33.6	0.03	5.3
Kentucky	1.6	1.2	73.2	0.35	22.0	0.08	4.8
New Hampshire	0.59	0.38	65.0	0.20	33.6	0.01	1.4
New Jersey	6.1	3.9	63.5	2.0	33.5	0.2	3.0
Tennessee	2.2	1.5	69.9	0.51	23.5	0.1	6.6
Texas	10.2	6.1	59.8	3.5	34.4	0.6	5.8
West Virginia	1.2	0.59	48.2	0.57	46.7	0.06	5.1

[a] Support services include general and school administration, operations and maintenance, and transportation, among others.

Source: National Center for Education Statistics, *Digest of Educational Statistics, 1989*, Washington, D.C., NCES, 1989, p. 154.

• **LEVEL E--Central Office Instructional Support:** Districts in this study spent very little on Central office support services, vesting most of their instructional resources in the schools. In the Lilly districts, District II indicated spending 4.25 percent or $344 per student on central office support (curriculum and test development, writing handbooks and developing materials for use in classes by teachers and students. Colorado showed a similar range, from zero percent in District III to a high of 2.91 percent in District I.

•• **Level e-- School Site, Direct Classroom Instruction:** Remarkably, the data on resources reaching the classroom in Colorado and the Lilly districts was very similar to national studies and California, with all being between 66.12 percent in District VII in Colorado data to a low of 50.81 percent. Lilly averaged 59.86 percent, right at 61.11 percent when the Central Big **E** is added in. The range was from 63.33 percent in District VI to 54.71 percent in District VI. Interestingly, District VI spent the most on Buildings and Facilities (Level **b**) at 22.04 percent and among the least on Instruction (Level **e**) at 57.48 percent. The per pupil costs in the Lilly districts shows a high of $4,715 per student in District II, and a low of $1,828 per student in District I, a district which spent a low amount in the schools all together ($2,686 per student) compared to the average of $4,504 per student in school-site spending.

Overcoming the Tyranny of the Average

*C*harles Benson used to explain the problem of depending on average costs since they mask diversity. He asked, "If I have my left foot in boiling water and my right in iced water, why am I not feeling *on average* very good?" The micro-finance Model confirms the "average" costs often gathered in other studies, although, unlike many other approaches, the SSAM also has the capacity to break out costs by school type and by individual schools and sites.

3. How do total and functional costs vary by Elementary, Middle, and High Schools? The data gathered in these 25 districts indicate that Elementary schools as a type receive less resources and therefore have less in the classroom proportionately.

Table 5 shows the eight Lilly districts with the per pupil and percent of total per pupil costs spent by type. The average reaching all schools regardless of type or level ranged between a high of 94.2 percent in District V, which is a relatively low-per pupil district at $3,730 per student overall expenditures, to a low of 85.49 percent in District II and 85.53 percent in District VIII.

Taking the average as the baseline, we see that Elementary Schools in every case received below the average percent of total per pupil. and well below the secondary school percentages. In District III (see Table 5), for example, the Average of all schools received $3,909 per pupil or 79.6 percent of the total district per pupil cost. Elementary schools, top line of Table III, received almost 26 percent less at $2,638 or 53.7 percent (79.6% – 53.7% = 25.8%) Furthermore, the differences between Elementary Schools and

TABLE 5

EIGHT DISTRICT DATA ON Funding by School Type or Level: Per Pupil and as Percent of Total District-wide Average, 1991-1992

Site Total Per Pupil	Level	School Site Per Pupil	Percent of Total Per Pupil
I	Elementary	$ 2439	80.7%
	Middle	2626	86.8%
$3024	Secondary	3338	110.4%
	All Schools	2686	88.8%
II	Elementary	5681	73.9%
	Middle	N/A	N/A
$7693	Secondary	9027	117.3%
	All Schools	6577	85.5%
III	Elementary	2638	53.7%
	Middle	3909	79.6%
$4913	Secondary	5051	102.8%
	All Schools	3909	79.6%
IV	Elementary	4016	79.7%
	Middle	5310	105.4%
$5037	Secondary	5530	109.8%
	All Schools	4580	90.9%
V	Elementary	3004	80.5%
	Middle	3455	92.6%
$3730	Secondary	4366	117.1%
	All Schools	3512	94.2%
VI	Elementary	3068	79.9%
	Middle	3907	101.8%
$3839	Secondary	3829	99.7%
	All Schools	3533	92.0%
VII	Elementary	3717	82.5%
	Middle	4030	89.4%
$4507	Secondary	4359	96.7%
	All Schools	3960	87.9%
VIII	Elementary	3179	78.1%
	Middle	3920	96.2%
$4073	Secondary	4266	104.7%
	All Schools	3606	85.5%

BEST COPY AVAILABLE

High Schools in District III was 102.8 percent or $5,051 per pupil at the Senior High level and, again, $2,638 per student or 53.7 percent at the Elementary Schools taken together. The difference then was $2,413 per student between High School and Elementary or 49.1 percent. The Middle Schools in District III were in between, at $3,909 which was exactly the District average of what reached the school.

In other Districts, too, the types of schools were graphically different. The highest to reach the Elementary Schools occurred in District VII at 82.5 percent while the High Schools in the same district received 96.7 percent (the District lowest percentage to secondary schools) and Middle Schools 89.4 percent. Districts II and V had the most percentage points reaching the High Schools at 117.3 percent and 117.1 percent respectively. The Model also permits tracking resources to each function within each type of school: Administration in Elementary, Middle, and High Schools; Operations in each and so forth.

Thus, despite all the discussion and policies concerning earlier intervention and more resources reaching younger children to prevent the development of life-long problems (lack of reading and mathematics accomplishments in the lower grades), these data based on the SSAM model show up the wide differences *within the same district* in resources being spent in Elementary, Middle, and High Schools in all eight of the Lilly districts across the nation.

INDIVIDUAL SCHOOLS and Functions

The SSAM was designed to track resources to the classroom in each school. Hence, this section of the study is critical to be able to located the costs in each school in a system. One way to present the school-by-school data is to isolate the "high" and "low" school functions within a system and to analyze the "outliers." Table 6 indicates the application of the SSAM to the location of extreme examples of school site expenditures, as well as averages, when resources were tracked through the school systems and into the schools, from the schools to the classroom. The School data are accurate and real; the names given the schools

are changed to preserve some anonymity. However, these schools are located in a Colorado district.

Table 6
High and Low School Per Pupil Expenditures Showing ("Outliers") by Type and Function, with Average Expenditures, 1991 Colorado District

(Total Per Pupil: $4,141; Total Spent: $73.558 million)

SCHOOL SITE: / FUNCTION:	I. Per Pupil	II. Percent of School	III. Percent of District (Total $4,141 per pupil)
a. ADMINISTRATION:			
HIGH:			
Lakes Elem. School	$699 per pupil	14.62 %	16.88 %
Wellingford Jr. High School	$669 " "	11.57 %	16.88 %
Century Senior High School	$1075	13.75 %	25.96 %
- - - - - AVERAGE:	**$292 " "**	**7.99 %**	**7.05 %**
LOW:			
Travel Elem. /Bennettton El. Sch.		$196	6.15 % 4.73 %
Black Junior High School	$253	6.61 %	6.11 %
Westside Senior High School	$385	8.96 %	9.30 %
b. BUILDING SUPPORT			
HIGH:			
Lakes Elem. Sch.	$766 per pupil	9.82 %	18.50 %
Wellingford Jr. High School	$1,056 " "	18.27 %	25.50 %
Century Sr. High School	$788	9.87 %	9.87 %
- - - - - -AVERAGE:	**$496 " "**	**13.59 %**	**11.99 %**
LOW: Shepard Elem. School	$228	5.51 %	7.54%
Lesser Jr. High School	$392	11.03 %	9.47 %
Mountain Sr. High Sch.	$618	14.85 %	14.92 %
d. PUPIL SUPPORT			
HIGH: Oleander. El. School	$206" "	5.56 %	4.97 %
Wellingford Junior High School	$378	6.54 %	9.13 %
Century Senior High Sch.	$1,082	13.56 %	26.13 %
- - - - - AVERAGE:	**$201 " "**	**5.50 %**	**4.86 %**
LOW:			
Lake Element. and Nevermore Elem. School	$46	1.00 %	1.11 %
Webster Junior High School	$198	5.10 %	4.78 %
MOUNTAIN Sr. High Sch.	$276	6.62 %	6.67 %

Table 6 (continued)

SCHOOL SITE: FUNCTION:	I. Per Pupil	II. Percent of School	III. Percent of District ($4,141 per pupil)
e. INSTRUCTION			
HIGH:			
Canyon Elemen. School	$6,799 per pupil	87.00 %	164.19 %
Wellingford Jr. High School	$3,674 " "	63.56 %	64.24 %
Century High School	$5,002	62.67 %	120.79 %
- - - - - - - -AVERAGE:	**$2,660 " "**	**72.81%**	**64.22 %**
LOW: Johnstone Elem. School	$ 2,165	70.51 %	52.28 %
Lark Jr. High School	$2,578	72.51 %	62.26 %
Coalson Senior High School	$2,682	71.50 %	64.77 %
d/e. PUPIL SUPPORT + INSTRUCTION			
HIGH:			
Canyon Elem. School	$6,846 per pupil	86.32 %	162.91 %
Wellingford Jr. High School	$4,052 " "	70.09 %	97.85 %
Century Senior High School	$6,084	76.23 %	146.92 %
- - - - - -AVERAGE:	**$2,861 " "**	**78.31 %**	**69.09 %**
LOW: Johnstone Elem. Sch.	$2,303	74.99 %	55.61 %
Lesson Junior High School	$2,834	79.72 %	68.44 %
Coalson Senior High Sch.	$3,093	74.69 %	77.29 %
TOTAL: (a thru e)			
HIGH: Canyon El. Sch.	$7,815 per pupil	100%	188.72 %
Wellingford Junior High School	$5,781 " "	100 %	139.60 %
Century Senior High Sch.	$7,981		190.56 %
- - - - - - -AVERAGE:	**$3,653**	**100%**	**88.22 %**
LOW: West Elem. School	$2,880	100%	69.55 %
Lesson Junior High School	$3,555	100 %	85.85 %
Coalson Sr. High School	$4,003	100%	96.67 %

The data are presented by function, Levels **a, b, c, d, e,** and **d+e,** and Total, separated by the High and the Low outlier for each school type. Hence, as shown in Table 6, Level **a, Administration,** indicates that Lakes Elementary School spent the most for Elementary Schools at $699 per pupil for administration, which was almost 15 percent of the money in that school and 16.88 percent of the District-wide average of $4,141 per pupil.

WellingfordJunior High spent $669 or 11.57 percent of school costs and 16.16 percent of the District cost average. Century Senior High was the highest by individual schools in School-Site Administration, at $1,075 per student, 13.75 percent of the School-Site costs and 25.96 percent of the District per pupil costs ($4,141 per student).

The average for the School-site administration, Level **a,** was $292 or 7.05 percent, with the lowest per pupil costs for this function at both Travel and Bennetton Elementary at $196 per student which was only 4.73 percent of District wide average costs per pupil. Black Junior High was low by this category of school at $252 per student and West Senior High spent only $385 per student on Administration while the "high" outlier High School was $690 per pupil above.

The "outlier"s for **Operations and Facilities** , Level **b,** were also fairly extreme. At the high end, Lake Elementary spent $766 (18.5 percent of district average as shown in Table 6, column III), Wellingford Jr. High was highest in the whole District per pupil at $1,056 per student or 25.5 percent of District and 18.27 percent of the resources spent in the school. With the average at $496 per pupil or 11.99 percent of District costs per pupil, three schools are the "low outliers," Shepard at $228 or 7.5 percent of District per capita costs, Lesser Junior High at $392 per student or 9.47 percent, and Mountain Senior High at $619 per student or 14.92 percent.

This model alerts district leaders to the high cost of running Lakes Elementary, for example, because it spent almost 17 percent of the Districtwide average per pupil cost ($4,141 per student) on Administration and 18.5 percent for Level **b, Buildings and operations.** Together, this school is spending over 35 percent of the district per pupil average on just administration and Operation. When the 12 percent Central Office costs are added on, the model yields data to show that 47 percent of the District per pupil costs are spent on Central Office LEVELS **A** thru **E,** plus school-site Administration and Operations (Levels **a+b**)

This "high" and "low" analysis, made possible by the breaking out of costs by school and function, is also useful in tracking funds to the classroom at Level **e, Instruction.** Table 6 also shows that schools vary enormously on this dimension, with Canyon Elementary School expending $ 6,799 per pupil, which is 164.19 percent of the District total average and 87 percent of what it receives. The Wellingford Junior High and Century High spent the most per pupil and by percent for Instruction, at 64 and 121 percent, when the average was 64.22 percent or $2,660 per student. The average was $2,660 per student or 64.22 percent reaching the classroom for Instruction.

When Student Support, Level **d,** and Level **e, Instruction,** are combined as shown in Table 6, **d/e,** Canyon again led the District in direct students services, a very different story than when average district and state data are used. Canyon Elementary Schools expended $6,848 per student for these two function, which was the "high" at 165.32 percent, compared the District "low" outlier on direct services to students, Johnson Elementary at 55.61 percent with $2,303. The average for the district is 69.09 percent or $2,861 per student. Falling below this mean are Johnstone Elementary School at 55.61 percent, Lesson Jr. High at 68.44 percent or $2,844 per student, and Carlson Senior high at 77 percent, above the district average of 69 percent but below the "high" level secondary and middle schools.

When taken all together, the resources reaching the individual schools vary greatly, as the bottom lines of Table 6 show. The "high" outliers spent 189 percent Elementary (Canyon Elementary School), 139.6 percent for Wellingford Junior High, and Century High School spent 190.56 percent above the district-wide total cost average at schools of 88.22 percent. The lows are West Elementary with a total of about 70 percent, Lesson Junior High was low at 85.85 percent, and Coalson Sr. High School spent 97 percent in the classroom for instruction--low compared to the Century High, for example, which spent 191 percent of the District-wide average of $4,141 per pupil in total.

The Cascade

*F*igure 4 shows another way to present the information. The top of the diagram presents the "norms," the average expenditures for the typical school.

The district spent $73.558,115 million in total in 1991-92 or $4,141 per student overall (see point I on the diagram, Figure 4). Of that amoun', the Central Office costs came to $8.667 million (11.78 %) or $488 per student (Point II) while the allocation to the School Sites was $64.891 million or 88.22 percent of the District's expenses OR $3,653 per pupil (Point III on the diagram). The Classroom Level **e** (Point IV) totaled $47.244 million or $2,660 per student, which was 64.23 percent of the total expenses. Hence, while over 88 percent reached the school, **24 percent** of the system's resources were used *in the schools* but *not in the classrooms* on Level **a** through Level **d** (difference between about 88.22 percent in the school and 64 .22 percent at the classroom level).

Further, the "outlier" Elementary Schools are interesting to examine since the indicate the disadvantage of using only the *average* costs in studying allocations. Among Elementary schools, the Canyon Elementary School, for example, spent the most in the Classroom at Level **e** at $6,799 per student or about 164.19 percent of the total District-wide per pupil of $4,141. This amount at Level **e** was 100 percentage points above the average in the classroom of 64.22 percent, and 112 percent above the lowest spending school, Johnstone Elementary, at $2,165 per pupil or 52.29 percent at Level **e.** Thus, $4,634 per student separates the "outliers" among the Elementary schools in this School District, ($6,799 subtract $2,165 per pupil in 1991). Similarly, the two schools received a vastly different amount for all functions, **Levels a - e,** with the Canyon Elementary School spending $7,815 per student or 188.72 percent of the District-wide per pupil average, compared to only $2,880 per student coming to Johnstone Elementary School, which was 69.55 percent. Thus, $4,934 per student separates the highest and lowest school allocations in the district.

Figure 4

Allocation ANALYSIS: AVERAGE and HIGH/LOW Elementary SCHOOLS, 1991

I. • TOTAL Allocation: $73.558 million
Per Student: $4,141 (100% of system)

II. • Spent at Central Office: $8.667 million
Per Pupil: $488 (11.78 % of system) for A thru E

A (Administration
B (Building Support)
C (Teacher Support)
D (Pupil Support)
E (Instructional Support)

III. Spent at TOTAL SCHOOL SITE(S): $64.891 million
Per Pupil: $3,653 (88.22 % of system)

a (administration)
b (building support)
c (teacher support)
d (pupil support)

••e (instruction)

IV. • Spent in the Average Classroom: $47.244 million
Per Pupil: $2,660 (64.22 %)

ELEMENTARY SCHOOL "OUTLIERS"

V. HIGHEST ALLOCATION:	V. LOWEST ALLOCATION:
• Canyon Elementary School)	• (Johnstone Elementary School)
School Level :	School Level:
$7,815 per student (188.72 % of system)	$2,880 per student (69.55 %)
a administration	a administration
b facilities	b facilities
c staff support	c staff support
d pupil support	d pupil support
VI. • e Classroom :	VI. • e Classroom:
$6,799 per student, (164.19 % of system)	$2,165 per student, (52.29 % of system)

Among the Junior High Schools, **Wellingford Jr. High School** spent IN TOTAL the most at 139.60 percent of the average per pupil or $5,781 per student with

88.72 percent or $3,674 reaching the Classroom in Level **e**, while **Lesser Jr. High School** spent much less than Wellingford Jr. High at $3,555 or 85.85 percent of the total per pupil costs expended in the school, with about 62.26 percent reaching the classroom at Level **e**.

Figure 4: Continued
High/Low Schools Overall, Across Types:
Junior High School "Outliers"

V. HIGHEST ALLOCATION:	V. LOWEST ALLOCATION:
• (Wellingford Junior High School)	• (Lesser Junior High School)
School Level :	School Level:
$5,781 per student (139.60 % of system)	$3,555 per student (85.85 %)
a administration	a administration
b facilities	b facilities
c staff support	c staff support
d pupil support	d pupil support
VI. • e Classroom :	VI. • e Cias. oom:
$3,674 per student, (88.72 % of system)	$2,578 per student, (62.26 % of system)

Hence, Wellingford spent about 51 percent of its resources internally (139.60 % for **a to d**, subtract 51 % for Level **e, Instruction,** leaves 88.72 percent for **a--d**). While the average percent reaching the classroom was 64 percent, as shown in Point IV in Figure 5, the range went from about 164 percent at Canyon Elementary School, through 89 percent at Wellingford Junior High School, down to 52 percent at Johnstone Elementary School.

Eight-District Comparison of "OUTLIERS"

*T*able 7 shows Elementary School expenditures for AVERAGE, "Highest," and "Lowest" spending Elementary school in each of the eight sample districts. The data are presented in the following order: the Average cost per pupil for the whole district (column I), the per student dollars and percentages reaching the schools (column II), the per pupil and percentages reaching the Classroom, Level **e** (column III). Column IV

shows the percent of the total per pupil costs for the "system" and column V is the percentage of the resources spent in that school. To preserve the anonymity of the districts and the "outlier schools), the name of the Elementary schools in each district are left out.

TABLE 7

EIGHT DISTRICT DATA ON "High" and "Low" Elementary Schools, Classrooms and System Costs by Per Pupil and Percent of District and School Site Costs, 1991-92

Site		I Per Pupil Total	II Per Pupil to School		III Per Pupil to Classroom	IV % of System	V % of School Site
I	AV. TOTAL	$ 3024	$ 2686	88.8%	$ 1828	60.5%	68.1%
	School High		3125	103.3%	2223	73.5%	71.1%
	School Low		2121	70.1%	1452	48.0%	68.5%
II	AV. TOTAL	7693	6577	85.5%	4573	59.4%	69.5%
	School High		7193	93.5%	5097	66.3%	70.9%
	School Low		4662	60.6%	3562	46.3%	76.4%
III	AV. TOTAL	4913	3909	79.6%	2688	54.7%	68.8%
	School High		3926	79.9%	2818	57.4%	71.8%
	School Low		2670	54.4%	1964	40.0%	73.6%
IV	AV. TOTAL	5037	4580	90.9%	3048	60.5%	66.6%
	School High		4305	85.5%	3089	61.3%	71.8%
	School Low		3601	71.5%	2421	48.1%	67.2%
V	AV. TOTAL	3730	3512	94.2%	2354	63.1%	67.0%
	School High		3183	85.3%	2350	63.0%	73.8%
	School Low		2799	75.0%	1903	51.0%	68.0%
VI	AV. TOTAL	3839	3533	92.0%	2206	57.5%	62.4%
	School High		4653	121.2%	3009	78.4%	64.7%
	School Low		2598	67.7%	1491	38.8%	57.4%
VII	AV. TOTAL	4507	3960	87.9%	2786	61.8%	70.4%
	School High		5056	112.2%	3489	77.4%	69.0%
	School Low		3131	69.5%	2034	45.1%	65.0%
VIII	AV. TOTAL	4073	3606	88.5%	2490	61.1%	69.1%
	School High		5352	131.4%	3666	90.0%	68.5%
	School Low		2328	57.2%	1401	34.4%	60.2%

only the term School High and School Low are included.

For example, in District I, the total per pupil costs were $3,024 for all costs. Of that amount, some 88.8 percent or $2,686 per student, was allocated to schools (Levels **a thru e**) and 60.5 percent reached the Classroom, Level **e.** The Elementary School "outliers" in that district spent 103.3 percent at the highest and 70.1 percent at the lowest ($3,125 versus $2,121 per student). Of that amount, 73.5 percent reached the Instructional program in the 'highest' outlier and 48 percent in the lowest.

District VIII shows the widest spread between "high" and "low" outlier schools: with the average at 61.1 percent, the highest-expenditure Elementary School received 131.4 percent of the District per pupil average of $4,073 (see column I), put 90 percent into the classroom or $3,666 per pupil, while the "low" outlier expended only 34.4 percent after receiving only 57.2 percent at the school site (for **a thru e**).

Hence, while the national expenditures on "instruction" repeatedly average about 61 percent (see National Center for Educational Statistics, 1988; Odden, 1992), the SSAM model points up the great variation between even Elementary schools (not including the even wider differences between Senior High and Elementary schools) ***within the same district.*** While these data too show around 60 percent on average being spent in these eight sample districts (see Table 7, column IV, first line of each district's data), the distribution of the schools above and below the mean is often quite wide. District I has 60.5% Average, with a High of 73.5% and a low of 48%. District II averaged 59.4%, with the High at 66.3% and the Low 46.3%. District III, 54.7 percent average, 57.4% High and 40% Low. District IV had 60.5 percent with a High of only 61.3% and a low of 48.1 percent, and so forth.

The value, then, of this Model is its ability to track resources to the instructional sub-system in each and every school. The variety and diversity is far greater ***within*** school districts than ***between*** them, meaning that averages as reported in most surveys and studies of school finance are obscuring the great differences in how schools spend their resources. Accuracy is greatly enhanced, as this study shows, by treating the school as the

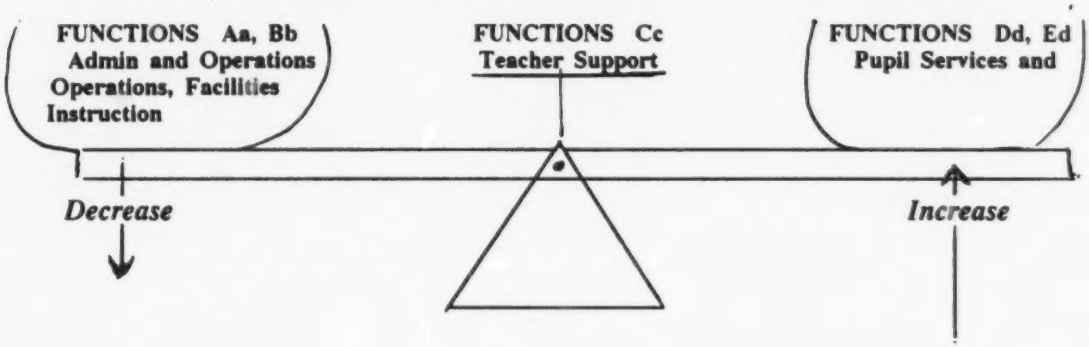
proper unit for micro-financial analysis and the Classroom Instructional level as the place where much "intentional learning" occurs. The next step is to test the ability of these data to produce usable "efficiency" and "productivity' measures, now that accurate school-site and classroom-level data are available and analyzed across a number of diverse school systems.

- - - from ACCURACY to SCHOOL SITE EFFICIENCY

Another use of the Model is to test the relationships between school efficiency and characteristics and qualities of these schools. Figure 5 presents a "see-saw" diagram which depicts a hypothetical balance between the "system's maintenance" functions (**Levels A+B+C+D+E,** plus **Levels a+b+c**) and the cost of the "student services" side of the fulcrum (**Levels d+e, Pupil Support + Instruction,** or **Level e, Instruction**).

Figure 5

Balance of Administration/Operations with Direct Services and Instructional Services for Students



Using this concept of a balanced between Pupil Services and Systems Services, we constructed two efficiency measures: First, the **Student INSTRUCTIONAL Ratio** (SIR) determines the ratio or relationship of per pupil costs in the classroom (Level **e**) to

those devoted to administration and operations at Central Board and in each school. The formula for calculating instructional efficiency at each school, the **Student Instructional Ratio**, is the cost of direct classroom INSTRUCTION--Level **e**, divided by the combined costs of LEVELS **A,B,C,D, E + a, b** , or the ratio of classroom resources versus other support costs. Second, the Student SERVICES Ratio (SSR) indicates the ratio of per pupil support to actual resources spent on students both inside and outside the classroom. The formula for SSR (Student SERVICES Ratio) is the combined per pupil costs of Levels **d+e** at each schools, divided by the net per student cost of LEVELS **A,B,C,D,E + a,b** for each school.

To analyze the school qualities and characteristics which might relate to these efficiency levels, we cross-correlated the SIR and SSR with four school characteristics, the Independent Variables: School Size, District Location, SES, and School Type with Efficiency. See Table 8 for the correlation scores of the four independent variables and the SIR. We had might relate when a correlation among the four predictor some indication

Table 8
Cross–Correlation of Instructional Efficiency (SIR) and Four Key School Variables (Size, Type, Location, and SES)

Variable	DISTRICT	School TYPE	School SES	School SIZE	School SIR (effic)
DISTRICT		-.038	-.043	.009	.352
TYPE			.555	.355	-.090
SES				.571	-.342
SIZE					-.368
Efficiency (Instruction)					

that these variables variables (Size, Location, SES, and TYPE) and the Efficiency measures, SIR and SSR, produced rather strong relationships. We then performed

regression analysis, in particular the Pierson Product Moment Correlation, to explore the relationship between these five variables together: Size, Type, Location, and Socio-Economic Status, with system and school Efficiency (both the SIR and SSR).

- **SCHOOL INSTRUCTIONAL EFFICIENCY (SIR):** The first analysis related school qualities to the resources reaching the classroom, SIR. Stepwise multiple regression analysis was used to estimate the impact of school **size** (the smaller the school, the less efficient), school **type** (elementary schools are systematically less efficient), **SES** (the poorer the school, the less efficient), and **District** (no clear explanation). The regression equation for SIR was the following: Classroom Efficiency by school: with y_1 = Student INSTRUCTIONAL Ratio (SIR) in a regression equation:

SIR = –.284 SIZE + .350 DISTRICT –.258 SES + .168 SCHOOLTYPE + + (15.492 Constant).

The regression analysis produced significant results, as shown in Table 9 for the SIR.

Table 9

Regression Analysis of School Characteristics and School Efficiency, Using Micro-Financial Data Student Instructional Ratio (SIR)

Variable	B	SE B	Beta	T.	Sign. T
SIZE	-2.22309	3.92077	-.283521	-5.670	.0001
DISTRICT	.921597	.107995	.350180	8.537	.0001
SES	-.998088	.217351	-.257965	-4.592	.0001
Type of School	1.034783	.304155	.167690	3.402	.0007
(Constant)	13.295871	.858217	- - - -	15.492	.0001

Using this equation, we were able to explain 30 percent of the variance in the first efficiency model, which included SIZE, DISTRICT, SES, and School Type. The first equation was significant at the .0001 level on an F-test. The results were as follows:

Multiple R	**.54872**
R Square	**.30109**
Adjusted R Square	**.29438**
Standard Error	**4.05344**

F = 44.91052 Significance F = .0001

While this first model explained 30 percent of the variance, some 70 percent was not explained by the predictor variables. This limited explanation was to be expected given that site-specific data, interviews, and other information were not gathered. One can assume the importance of such other variables as leadership, organization, governance, and autonomy which are missing from the equation. The 30 percent and its significance, however, do show that the type, size, and SES of the school are related to the school's efficiency as measured by the micro-financial model.

• **STUDENT SERVICES RATIO:** Similar analysis can be performed using the other efficiency, that of Student SERVICES Ratio (SSR). This measure takes a slightly broader view of the efficiency of schools, arguing that children need not only more resources for Classroom Instruction but for support, extra-curriculum, coaching, guidance, library service, medical and psychological serves. The ability of schools to finance these extra services is, one can assume, an important test of the efficiency of the delivery system. In the Student Services Ratio, we divided classroom and non-classroom service costs by the Central (**A--E**) **+ a, b** at the school site, as discussed earlier.

The simple correlation scores among the five variables, SSR and Size, Type, SES, and District, are shown in Table 10.

Table 10
Correlation of Student Services Efficiency (SSR) and Four Key School Variables (Size, Type, Location, and SES)

Variable	District	School Type	School SES	School SIZE	School SSR (effic)
DISTRICT		-.038	-.043	-.009	.374
TYPE			.555	.355	-.029
SES				.571	-.278
SIZE					-.329
Efficiency (Student Services)					

Again, there were strong indications that these variables were related, calling for a regression analysis, Table 11 shows the betas for the four Predictor variables as well as the high level of significance of these findings. The equation for Student Service Ratio and the four predictor variables was as follows:

SSR =.375 DISTRICT - .283 SIZE + .205 TYPE - .214 SES + (13.174 Constant).

Table 11
Regression Analysis of School Characteristics and School Efficiency, Using Micro-Financial Data Student SERVICES Ratio (SSR)

Variable	B	SE B	Beta	T.	Sign. T
DISTRICT	1.230033	.135786	.375241	9.059	.0001
SIZE	-. 2.76510E	4.93156E	-.283127	-5.607	.0001
TYPE	1.576021	.382567	-.205052	4.120	.0001
SES	- 1.030531	.273385	-.213844	-.3770	.0002
(Constant)	13.17425	.1.079470	---	12.204	.0001

In this equation, the multiple R was .536, and the R^2 was indicating that about 29 percent of the variance in school efficiency is explained by the four variables. Again, the F score was 42.01493, which was significant at the .0001 level.

Multiple R	**.53596**
R Square	**.28725**
Adjusted R Square	**.28042**
Standard Error	**5.09843**
F = 42.01493	**Signif F = .00001**

Discussion: Initial attempts to build this model involved various combinations of predictor variables, which produced rather low relationships until the four variables (SIZE, TYPE of school, Socio-Economic Status, SES, of School, and DISTRICT regressed against school efficiency). Initial correlation analysis suggested relatively strong relationship between efficiency and the four predictor variables. The results of the linear multiple regression analysis showed a significant relationship between efficiency and school characteristics.

These preliminary analyses are interesting to consider. School districts, state authorities, and other policy makers have an opportunity to calculate the "efficiency" of each school, based on the cost of delivering the service to students, both instruction in the Classroom and other services outside the classroom (guidance, library, extra-curricula, media, clubs, health service). And as these regression analyses show, districts can determine what general characteristics are affecting efficiency.

Why, for example, are small schools more costly than larger ones? Why are elementary schools typically funded at a lower rate, forcing up their administrative and operational costs, and make them less "efficient" using this definition? Perhaps smaller schools should share certain administrative expenses, creating small systems of schools under regional

management. Such a move would allow for small schools, at lower costs, and thus keeping the management "overhead" under control.

- - *from EFFICIENCY to PRODUCTIVITY*

(Analysis performed by J. Samuels and S. Heinbuch)

The last test of the Model is to see how it lends itself to productivity analysis. The hypothesis is that schools and districts which spend more resources in the classroom, at Level **e, Instruction,** are more "efficient," and will have better academic and social outcomes, compared to schools and districts that spend relatively more on administration, operations, away from the classroom and the students (in school and central office). Prior to the development of the School-Site Allocations Model (SSAM), researchers lacked a systematic way to differentiate schools by their funding of the classroom level. Instead, Districts used average Instructional costs for the systems, which did not correlate well with academic and social outcomes (see Hanushek, 1989).

Although the purpose of our research and the development of SSAM was not directly aimed at the assessment of school productivity, we have kept this goal in mind from the onset. Thus, far, we have three settings where Efficiency (money reaching the classroom) and Productivity (test scores, graduation rates, absenteeism, SAT scores, reading scores) were related, with some preliminary results. The problems of relating resources to outcomes are monumental, since so many other variables intervene in this interaction: family income, neighborhood conditions, student background, prior preparation, language spoken in students' homes, and teacher quality.

Research on the New York City data (Sarrel) was performed (see Heinbuch and Samuels). A linear multiple regression model was developed to estimate the impact of classroom/instructional expenditures (Level **e**) on the average Scholastic Aptitude Test (SAT) scores in New York City's 115 high schools. Did instructional expenditures have a

significant impact on student achievement? If so, would additional dollars have a positive impact on achievement?

The Design

• **Sample:** The first step was to determine which of the City's 116 public high schools should be included in the research, given the wide variety of programs and missions. It was decided to examine the NYC academic high schools since they were uniformly funded, were typical of high schools across the nation, and were the largest in number: some 84.

• **Design:** The purpose of this section is to determine if expenditures in the classroom, Level **e, Instruction,** has an effect on pupil achievement, and thus by definition on the productivity of the school. From the research literature, other factors were also associated with attainment including teachers' work experience, socio-economic status of pupils, and the curriculum index (number of *academic* subjects taken by students). To control for student social class (SES), the schools were clustered (some call it "nested") into six homogeneous sub-groups to permit concentration on the key research variable, achievement.

• **Model:** A linear multiple regression equation was developed including a series of associated variables. The equation was -- **SAT = b_0 + b_1 CLUSTER + b_2 TEACHER/EXPERIENCE + b_3 PUPIL $ INSTRUCTION + μ**

The idea was to test the relative impact of these variables on the level of SAT for the 84 academic high schools in NYC Public Schools in 1990.

• **Definitions:** The following operational definitions are employed in this analysis: **SAT,** the dependent variable, was schools' mean Scholastic Aptitude Scores for Math and Verbal. **CLUSTER**, the first independent variable (b_1), was the grouping of sample high schools into six sub-groups by their socio-economic status ranging from wealthiest to poorest based on eligibility for federal funds under Chapter 1. **TEACHER EXPERIENCE** (b_2) was determined by calculating the average years of teaching experience in each school, as a control for teaching quality. And **PUPIL $ DOLLARS**

for **INSTRUCTION (PUP$INST)** was the key independent variable for this study (b_3), and was defined as the dollars per student allocated by the principal to the classroom plus other materials used for instruction. This independent variable (**PUPIL $ for INSTRUCTION**) was the percentage of dollars reaching Level **e, Instruction,** in the SSAM.

RESULTS

As shown in Table 12, the results of the regression analysis shows a high significant effect of social status of school (CLUSTER) with a beta of -38.75 (significant at the .0001 level), TEACHER EXPERIENCE (.11 at p≥ .001) and Pupil Dollars in the Instruction at .18 (.001 level). The R^2 = .65 (F=48.06 at .0001 level of significance). This combination of variables explained 65 percent of the variance in the SAT score in these 84 schools.

Table 12
Results of Regression Analysis Relating
SAT Scores to Funds to Instruction, Teacher Experience, and SES

Variable	ß	t
CLUSTER (SES)	-38.75	-5.58****
TEACHER EXPERIENCE	.11	3.77***
Dollars to INSTRUCTION	.18	3.02***

R^2 = .65 F = 48.06**** Adjusted R^2 = .64

**** Significance, p≥ .0001
*** Significance, p≥ .001

Hence, instructional expenditures do have a significant impact on academic high schools' average combined Math and Verbal SAT scores. Specifically, the spending of an additional $1.00 increases the score on the SAT by .18 of a point, on average, across the population of NYC schools. Another $100 (hundred) would increase the SAT test score by 18 points

and a $1,000 (thousand) more would improve the results by 180 points. In effect, the model suggests that per pupil dollars spent on direct instruction have a significant impact on academic achievement when controlling for the socio-economic status and teacher experience As the vast literature on school attainment suggests, furthermore, SES had a powerful effect on SAT scores as the table above suggests. By moving from the poorest to the next richest "cluster" or "nest," the impact on SAT is 38 points per cluster. Hence, the six clusters account for 190 points difference on the combined SAT score.

In summary, this early attempt to use the micro-financial model to ascertain the effect of resource use on school productivity (standardized student academic outcomes) raises some interesting possibilities. While the SAT is not an ideal measure of pupil achievement (since it comes at the end of the pupil's high school career and is not taken universally by all students), it does provide high reliability and validity and is widely given (unlike most state, regional, and local tests which are not usually generalizable to other states). The purpose, however, was to see if the School Site Allocations Model might be used to assess outcomes in the nation's largest and most complex school district, New York City. For a first attempt, the relationship between resources allocated to students in the classroom and a reliable cognitive outcome deserves further attention and research.

CONCLUSIONS

The purpose of this study was to develop and apply a micro-financial model, one tracking resources through school systems to the student in the classroom and elsewhere. The first step was the design and testing of the model in a variety of school districts across the nation. Next, data from the test sites were analyzed to provide indicators of the range of costs to operate the Central Offices and Schools in the 25 school systems, and the use of funds for Administration, Operations, Staff Development, Student Support, and Instruction at both Central and Schools.

The SSAM showed itself acceptable, workable, and effective in reporting the uses of funds by school and by function, by level and by type. Importantly, in the 23 districts, the superintendents, chief financial officers, and MIS staff found the Model "friendly" enough that these professionals could reconfigure their past year's expenses to conform to the ten categories and calculate costs for --

Levels A/a--ADMINISTRATION: Central and Schools; Levels B/b--OPERATIONS: Central and Schools; Levels C/c--STAFF SUPPORT: Central and Schools; Levels D/d--PUPIL SUPPORT: Central and Schools; and Levels E/e--INSTRUCTIONAL SUPPORT: Central and School.

Once the costs were allocated by location and function, Districts were able to track funds to each school and classroom level. "Outlier" analysis permitted leaders to examine particular schools which were overly costly or underfunded, to determine how best to fund schools and get resources to students. A number of superintendents reported that the SSAM data allowed them to save money, improve programs, and reassure the voting public that resources were going into worthwhile functions. Even when the Model turned up a costly "outlier" school, the superintendent had the opportunity to explain that, yes, Coal Creek Elementary School was most expensive to administer, run, and maintain because it was located 89 miles from the district's population center, was high in the mountains, was expensive to transport, heat, maintain, and was too small to be very economical. "No," he reported, "the district could not close the school because the students lived too far away from the nearest accessible school."

This district, having made it explanations clear based on the SSAM data, went on to pass the largest bond issue in the State's history after 11 years of unsuccessful attempts. Even the public will accept "bad news" on costs if the conditions are explained. Most voters, even "elderly voters", will back the schools if these citizens are informed about where money is going and why.

Using the School-Site Allocations Model not only at the District level but statewide (bringing consistency to the state's chart of accounts across the jurisdiction) has major advantages as well. As Odden (1992) so aptly explains, accounting for funds at the school and classroom levels fits nicely into the whole movement for school reform, from choice to school improvement. Even if American schools remain as they are, superintendents, school boards, school business officials, not to mention John and Joan Q. Public, need to know where they resources are going and how to get more help to students. Tracking resources through the system to the school, classroom, and students, as this research has indicated, is now not only possible but perhaps inevitable.

Furthermore, some research in Texas (see Ferguson, 1991) indicates that spending money on class size and teachers with experience and training -- all of which would drive up the expenditure level at Level **e, Instruction,** in our Model -- does have a positive effect, or a "threshold effect," as Ferguson calls it, on pupil achievement. Using data from reading tests given at grades 1, 3, 5, 7, 9 and 11, Ferguson found that reducing class size -- an expensive reform-- improved performance when the teacher pupil ratio was greater than one teacher to 18 students.

He determined that teachers with Master's degrees (at a higher salary than less educated teachers) "explained about 5% of the variance in student scores across districts for the primary grades" (Kazal-Thresher, 1992, p. 31). He learned that teacher experience was a significant contributor to pupil attainment, although once elementary school teachers reached five years on the job the differences started to diminish, and above nine years in high school. Hence, teachers with five or more years in lower grades and nine or more in the upper grades made contributions to pupil outcomes on the Texas reading test. However, as with other studies, the Ferguson research uses aggregate state data, particularly the averages of 900 districts. Despite the lack of classroom and school-site information, the Ferguson study suggests that putting more money into smaller classes, better trained and more experienced

(and most expensive) teachers led to higher test scores -- as the result of spending more money closer to students (classrooms and teachers).

Thus, money does matter, it seems, as long as the resources reach schools, classrooms, teachers and pupils. This reality is beginning to dawn on school finance and policy makers, as Odden (1992, p. 340) depicts the movement from an emphasis on central and state to a focus on individual schools and classrooms:

> In short, moving education finance from District to School finance focuses education funding on the organizational units -- schools -- responsible for producing bold new student performance levels embodied in the country's education goals. The new finance structure would meld with public school choice program. It is a structure that fits with school-linked social services. It is a structure that, while dramatic on the surface, simply take many elements of the current district-based finance structure and shifts them to the schools. . . Finally, if the school is the production unit in the system, then propose structure could dramatically improve the productivity of the education system, a long-sought-after goal.

--END--

REFERENCES

Brown, Daniel J. (1990). *Decentralization and School-Based Management.* London: Falmer Press.

Burrup, Percy E. et al. (1988). *Financing Education in a Climate of Change.* 4th Edition. Boston: Allyn and Bacon.

Clune, William and White, Paula (1988). *School Based Management: Institutional Variation, Implementation, and Issues for Further Research.* New Brunswick, NJ: Rutgers University, Center for Policy Research in Education.

Cooper, Bruce S. and Sarrel, Robert (1992). "Managing for School Efficiency and Effectiveness." *National Forum of Educational Administration and Supervision Journal.* 8(3), pp. 3--38.

Ferguson, R.F. (1991). "Pay for Public Education: New Evidence on How and Why Money Matters," *Harvard Journal on Legislation. 28,* pp. 465--498.

Guthrie, James W., Kirst, Michael W., and Odden, Allan R. (1990). *The Conditions of Education in California, 1989.* Berkeley, CA: University of California School Education, Policy Analysis for California Education, PACE.

Hanushek, Eric (1989). "The Impact of Differential Expenditiures on Student Performance," *Educational Researcher*, 18(4), pp. 45–52.

Kazal-Thresher, Deboral M. (1992). "Educational Expenditures and School Achievement: When and How Money Can Make a Difference." *Educational Researcher*. Vol. 22, No. 2. March 1993, pp. 30–32.

Malen, Betty, Ogawa, Rodney, Kranz, Jennifer (1990). "What Do We Know about School\ Based Management? A Case Study of the Literature--A Call for Research." In William H. Clune and John F. Witte, eds. *Choice and Control in American Education*. Vol. 2, *The Practice of Choice, Decentralization, and School Restructuring*. Bristol, PA: Falmer Press, pp. 289–342.

Mintzberg, Henry. (1987). *The Structuring of Organizations: A Synthesis of the Research*.. Englewood Cliffs, New Jersey: Prentice-Hall.

The National Center for Education Statistics (1987). *Digest of Educational Statistics*. Washington, DC: National Center for Educational Statistics.

Odden, Allan R., Ed. (1992). *Rethinking School Finance: An Agenda for the 1990s*. San Francisco: Jossey-Bass.

Odden, Allan R. and Picus, Lawrence O. (1992). *School Finance: A Policy Perspective*. New York: McGraw-Hill.

Purkey, S.C. and Smith, M.C. (1985). "The District Policy Implications of the Effective Schools Literature." *Elementary Schools Journal*, 85, pp. 353–389.

Weschler, Dana (1990). "Parkinson's Law 101," *Forbes*, June 25, 1990, pp. 50-56.

Wohlstetter, Priscilla and Buffett, Thomas Marshall (1992). "Promoting School-Based Management: Are Dollars Decentralized Too?" In *Rethinking School Finance: An Agenda for the 1990s*. Allan R. Odden and Lawrence O. Pincus, Eds. pp. 1 28–165. New York: McGraw- Hill.